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Wing-like Appendages on the Petioles of Liriophyllum populoides Lesq. and Liriodendron alatum Newb., with Description of the Latter.

By Arthur Hollick.

(Plates 220 and 221.)

The specimens upon which this paper is based were recently found while re-arranging some material in the geological museum of Columbia College. One of them had been recognized by the late Professor J. S. Newberry as a new species, and upon the specimen of *Liriodendron* he had attached the manuscript name which is here retained. The *Liriophyllum* was merely labeled under its generic name. The reason for not having named it specifically will be apparent when the discussion in regard to it is reached. I have brought them together in this paper for the reason that, although representing different geologic horizons in the Cretaceous formation, they are biologically closely related, and also because we have in these two species the first record in either genus of the peculiar appendages to the petioles to which I wish to call particular attention.

Liriodendron alatum Newb. mss.

(Plate 220.)

Leaves 4–5 inches long by 3–4 inches wide, oblong or ovoid in outline, rounded or somewhat cordate at base; deeply emarginate at apex, lobed or constricted at sides, or merely with wavy

margins; petioles long, stout and conspicuously winged; nervation characteristic of the genus, consisting of two sets of parallel secondaries, one strong, connecting near the margins in festoons, the other weaker and intermediate with the former.

Laramie group, Walsenberg, Colo. Collected by Mr. J. Milligan under the direction of Mr. R. C. Hills.

The genus *Liriodendron* is represented in our living flora by a single species, *L. Tulipifera* L., our well known tulip tree, and a doubtful variety, *L. Tulipifera Chinense* Hemsl. from eastern Asia.*

In the past, however, ranging from middle Cretaceous through the Tertiary, we find a great number of species referable to the genus and its immediate ancestors, the leaves of which indicate diversities in form equal to those of the oaks of to-day and with a geographic range equally extensive.

An enumeration of all the described forms is not necessary here, as several papers upon the subject have been already written, prominent among which may be mentioned those by Dr. J. S. Newberry† and Mr. Theo. Holm.‡ Incidental comments may also be found in the works of Heer, Massalongo, Lesquereux, Ward and others.

If we examine the fossil species described under or referred to the genus we find the evolution of the leaf form to be exceedingly interesting and significant. The earliest ones (*Liriodendropsis simplex* Newb. mss., *Phyllites obcordatus* Heer, etc.) have little more than the characteristic emarginate apex by which to identify them with the genus. Others are slightly lobed or merely constricted at the sides (*L. primævum* Newb., *L. Meekii* Heer, etc.). Yet others are conspicuously lobed (*L. giganteum* Lesq., *L. acuminatum* Lesq., etc.), while the Tertiary species (*L. Procaccinii* Ung., *L. Helveticum* Fisch., etc.) are hardly to be distinguished from the living one. Attention may also be called, incidentally, to the fact that there was a constant increase in the size of the leaves during

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* 1. "Description of some new Phanerogamia collected by Dr. Shearer, at Kiukiang, China," S. Le M. Moore, Journ Bot. **13**: 225 (1875).

2. "Enumeration of all the plants known from China proper, Formosa, Hainan, Corea, etc." F. B. Forbes and W. B. Hemsley, Journ. Linn. Soc. **23**: 25 (1886).

† "The Ancestors of the Tulip-Tree," Bull. Torr. Club, **14**: 1–7. *pl. 61, 62* (1887).

‡ "Notes on the Leaves of *Liriodendron*," Proc. U. S. Nat. Mus. **13**: 15–35. *pl. 4–9* (1890).

the period of greatest development of the genus, in cretaceous times. The particular species with which this paper has to do is of importance for the reason that only one other *Liriodendron*, and that an imperfect specimen, has been described from the Laramie group (*L. Laramiensis* Ward, Bull. No. 37, U. S. Geol. Surv. 102, *pl. 48, f. 2*), and also because our species possesses the unique characteristic of a winged petiole. Leaving this feature to be discussed further on, attention is now called to the significance of the leaf forms.

From the standpoint of the evolutionist the development of the individual is the epitome of the development of the type, so that we ought to find some traces of the ancestry of the genus in the successive leaf development of our living tulip tree. This aspect of the subject has been commented upon by several of the authors previously mentioned, but their works were prepared previous to the issue of Lesquereux's posthumous "Flora of the Dakota Group" (Monog. No. 17, U. S. Geol. Surv., 1892), and the great development of the genus there brought out was not known to the writers; neither, of course, was the species which is described in this paper, so that many points of significance were missed by them.

During the present year I made a series of observations upon and collected a number of specimens of leaves from seedlings, saplings, shoots from old stumps, and the branches of mature trees. They, of course, vary exceedingly, but by regarding the series as a whole it will be seen that there is a most striking parallelism between the entire or merely undulate margins of the leaves from the seedlings and young shoots and the earliest fossil forms, represented by *L. simplex*, *L. primævum*, etc., while it is in the leaves of the more mature branches that the lobing becomes of sufficient prominence to compare them with later forms like *L. giganteum*, *L. acuminatum*, etc.

The significance of the wing-like appendages to the petiole may now be considered. Similar appendages have been noted in other genera, and we are indebted to Prof. Lester F. Ward for having presented the case of *Platanus* ("Palæontologic History of the Genus *Platanus*," Proc. U. S. Nat. Mus. 11: 39–42, *pl. 17–22*; "Origin of the Plane-Trees," Am. Nat. 24: 797–810, *pl. 28*), and

for showing that these appendages apparently represent former basilar lobes of the leaf, which have become detached and gradually crowded down the petiole until they finally exist as mere stipules at the bases of the petioles or on the branches adjacent. The living *Platanus occidentalis* L. often bears leaves on its young shoots which show basilar expansions similar to fossil ancestral forms, and the conspicuous foliaceous stipules at the bases of the petioles are familiar objects to us all. It seems reasonable, therefore, to attribute a similar origin to the conspicuous but fugacious stipules on the young saplings and shoots of *Liriodendron Tulipifera*, and this view is of course greatly strengthened by the discovery of the fossil species now under consideration. It is also of significance to note that the appendages to the petiole, as represented for the first time in *L. alatum*, made their appearance in the genus during the Laramie period, a time intermediate between the era of greatest lobation of the leaves in the middle Cretaceous and that of the development of a modern type in the Tertiary, in which the former excessive lobation has become greatly modified. This consideration of the subject logically leads to a discussion of the origin and significance of stipules in general, and raises the question whether they may all have had a similar origin. Such a question can not be decided, or even discussed at any length, until more data than are now in our possession have been accumulated, and the facts examined from the standpoint here indicated.

Liriophyllum Lesq.

The genus *Liriophyllum* was founded by Lesquereux (Hayden's Rept. U. S. Geol. & Geog. Surv. 1876, 482) to include certain leaves evidently closely allied to *Liriodendron*. Under it he subsequently described three species of leaves and one fruit.*

A comparison of these leaves with the specimen now before us

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* *L. Beckwithii* Lesq. Cret. and Tert. Fl. (1883) 76. *pl. 10, f. 1.*

L. populoides Lesq. l. c. 76. *pl. 11, f. 1, 2.*

L. obcordatum Lesq. l. c. 77.

Carpites liriophylli ? Lesq. l. c. 77. *pl. 11. f. 5.*

L. obcordatum was not figured at the time of its original description, but it may be found in Lesquereux' "Posthumous Flora of the Dakota Group" (Monog. 17: U. S. Geol. Surv. (1892) 210. *pl. 28, f. 7*).

will at once show that the latter is apparently identical with *L. populoides*, which supposition is supported by the fact that they were both found in the same geological horizon (Dakota group) near Morrison, Colorado. The one difference between them is the winged petiole which is such a prominent characteristic in our specimen. Its absence in Lesquereux' specimens is doubtless to be accounted for by the imperfection of his material, but a close examination of his *fig. 2* will show that there is a widening of the petiole where it is broken off, which evidently indicates the existence of similar appendages.

Finally I would call attention to a point which may have considerable significance in relation to the theory of the origin of stipules previously outlined. The specimens which are the subject of our illustration apparently represent a large mature leaf and a smaller immature one. In the mature leaf there is a distance of about three-eighths of an inch between the base of the leaf blade and the beginning of the winged appendages, while in the young leaf they are in juxtaposition, conditions which are to be expected if our theory of their origin is the correct one.

NOTE.—Since writing the above Dr. Britton has called my attention to the following, which is of peculiar significance in this connection:

The late Dr. Thomas Morong, in his manuscript of "The Smilaceæ of North and Central America," in speaking of the species which climb by means of tendrils growing from stipular wings on each side of the petiole, uses these words in a foot note: "De Candolle regards this appendage as more in the nature of a modified leaf segment or leaflet than a stipule, but it seems to me that a stipule is nothing else than a leaflet at the base of a petiole."*

Two Species of Oxalis.

BY JOHN K. SMALL.

(PLATES 222 AND 223.)

For several seasons during my excursions through portions of the Southern States I have met with a peculiar little *Oxalis*,

* See Bull. Torr. Club, 21: 419.

which became more and more interesting, as it was discovered at new and widely separated localities. For some reason every time I encountered the plant it suggested to me the name *Oxalis recurva*. After Elliott published that species* it received little recognition in the works of later botanists, and by them was generally recorded in an arbitrary manner as being identical with *O. stricta* or ignored altogether. When Dr. Trelease revised the genus in 1888† he attempted to reestablish Elliott's *O. recurva*, but, not having access to the type specimen, he went widely astray of the mark and applied Elliott's name to a very different plant. Dr. Trelease was apparently a little too unmindful of the laws of geographical distribution in concluding, especially without having seen the original specimen, that *O. recurva*, discovered on the coast of South Carolina, was a typically Middle States species.‡

As recorded in the MEMOIRS of the Torrey Botanical Club, 2: 44, Dr. Britton and party found what was then supposed to be *Oxalis recurva* at Roanoke and Eggleston's, Virginia. The following year (1891) Mr. Heller and myself, while passing through Roanoke, picked up some small specimens along the south bank of the Roanoke River, and pronounced them *Oxalis recurva*, on account of the strongly recurved pedicels; but on learning what was then known as that species, and being unable at that time to learn the cause of an evident confusion, the specimens were distributed as *Oxalis stricta*. Besides this locality, we also found similar plants a few days later near Gold Hill, in middle North Carolina. Little more was thought about the matter until the same plant turned up again further to the southwest, at the Falls of the Holston River, in Smyth county, Virginia, during the expedition of the Torrey Botanical Club to that region in 1892. In the report on that excursion§ the plant was reluctantly placed under *O. stricta*, and the supposed *O. recurva*, found further up the same river, recorded as such. In the spring of 1893, while collecting in company with Dr. Britton about the Great Dismal

* Bot. S. C. & Ga. 1: 526.

† Mem. Bost. Soc. Nat. Hist. 4: 71–104.

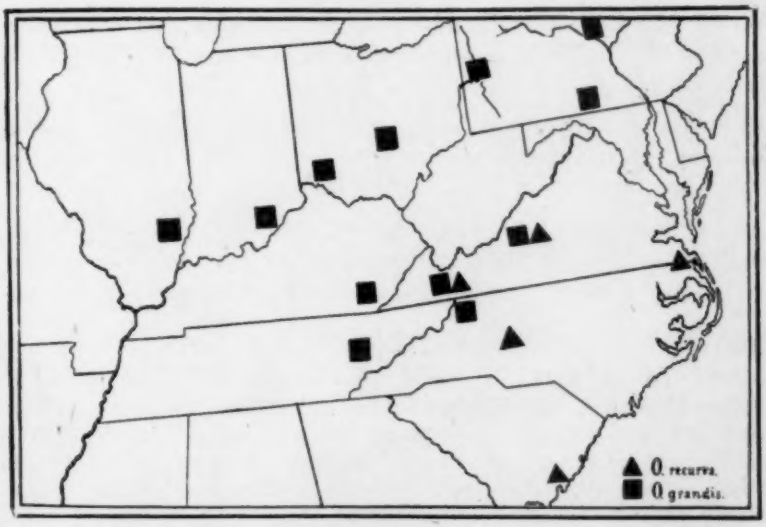
‡ Mem. Bost. Soc. Nat. Hist. 4: 87.

§ Mem. Torr. Bot. Club, 4: 109.

Swamp, the plant was found near North West, in southeastern Virginia.

Now with this geographical range to support a well-marked form the question arose: What is the plant? A new or a lost species?

While in Charleston last winter, I had an opportunity to examine the type of *Oxalis recurva* in Elliott's herbarium, at the Charleston College, and was not surprised to find that the small plant, which had been recently collected as cited above, was the same as Elliott's type. A comparative study of this form and the supposed *O. recurva* shows each to have, first, strong and constant morphological characters, which separate them from each other and related species, and second, a remarkably well-defined geographical range. A glance at the accompanying plates will convince any one of the specific validity of the two forms.



After dispensing with this part of the difficulty, a second question arose: What is the plant that has been passing for *O. recurva?* This form has been lying in herbaria, under one name or another, or unnamed, for many years. As far as I can discover, it appears to have been first found by Carey, at Wysox, Pennsylvania, in 1836, and then by Porter, at Mercersburg, in the same State, in 1850. During the last decade, especially the latter part,

this plant, apparently rare, has become epidemic, being found successively at Mt. Carmel, Ill.; Hanover, Ind.; Cincinnati, Ohio; Roanoke and Eggelston's, Va.; Wall, Pa.; Franklin Co., Ohio; Marion, Va.; Knoxville, Tenn.; the Cumberland Mountains, Ky., and Caldwell Co., N. C. I have searched carefully through the books containing references to the genus *Oxalis* and compared descriptions and plates. Nothing in them seems to correspond to the plant in question, and, as far as I can learn, it never has received a name except that given to it erroneously. *Oxalis grandis* is a name that will serve to designate its size and the stately habit it assumes in growing.

The two species are so very dissimilar that no detailed account of their respective characters is necessary, but descriptions and plates are added, which will serve to show the great contrasts between them. As mentioned above, the geographical ranges are remarkably well defined, and a map is also given, on which the stations and ranges are plotted as they are now known. The range of *O. recurva* lies mainly to the east of the Allegheny Mountains, while that of *O. grandis* is for the most part west. The two ranges meet on the mountains at the Roanoke and Marion stations in Virginia. At present, then, we have two beautifully contrasted geographical areas for the two species under consideration, but as exploration goes on, in and about the mountains, we may expect to find more or less over-lapping of the two ranges.

OXALIS RECURVA Ell. Bot. S. C. & Ga. 1 : 526 (1821).

Annual or perennial by a very slender rootstock or wiry stolons, slender, sparsely pubescent, dark or purplish green. Stem erect, 1–2 dm. long, wiry, mostly simple, leafy throughout; leaves small, .5–1.5 cm. broad; leaflets obcordate, as long as broad or longer than broad, sometimes acuminate at the bases, nearly glabrous or sparsely pubescent, sinus deep, acute; petioles 3–4.5 cm. long; inflorescence umbellate; pedicels 2–4, much recurved in fruit, 1–1.5 cm. long, usually glabrous; peduncles 5–7 cm. long; calyx 4 mm. long, parted to near the base, segments oblong-lanceolote, obtuse, with a tuft of trichomes at the apex; corolla deep yellow, 7 mm. long, petals emarginate; styles pubescent with appressed hairs; stigmas entire; pod slightly curved, 8–12 mm. long, more or less pubescent; seeds oblong or ovoid, 1 mm. long, obtuse, brown, marked with continuous, transverse ridges (Plate 222).

Geographical and altitudinal range: Charleston, S. Carolina, at sea-level (Elliott); North West, Virginia, at sea-level (Britton & Small); Roanoke, Virginia, altitude 1000 feet (Small & Heller); Falls of the Holston River, southwest Virginia, altitude 2000 feet (Small); Gold Hill, North Carolina, altitude 200 feet (Small & Heller).

OXALIS GRANDIS n. sp.

Oxalis recurva Trelease, Mem. Bost. Soc. Nat. Hist. 4: 89 (1888), not Ell.

Annual or perennial by a slender rootstock, rather stout, nearly glabrous or villous throughout, pale or light green. Stem erect, 2–4 dm. long, simple or sometimes sparingly branched, leafy above, soon naked below; leaves large, 4–7.5 cm. broad; leaflets usually unequal, obcordate, broader than long, mostly with a brown margin, more or less ciliate, sinus shallow but acute; petioles 4–12 cm. long; inflorescence subcymose or cymose; pedicels 1–1.5 cm. long, straight in fruit, pubescent, bearing one or two pairs of bracts; peduncles 8–13 cm. long; calyx 4–6 mm. long, parted to the base, segments unequal, ovate or linear-oblong, pubescent about the apex, sometimes sparsely ciliate and revolute; corolla bright yellow, 12–15 mm. long; petals 3–5 times as long as the sepals, not emarginate, with dark striæ about the centre or near the base; stamens persistent; styles very pubescent with spreading hairs; stigmas entire; pod narrowly-ovoid or oblong, acute, 8–10 mm. long; seeds 2 mm. long, rather unsymmetrical, oblong, acute, marked with interrupted transverse ridges and two conspicuous longitudinal ridges or crests on the back. (Plate 223.)

Geographical and altitudinal range: Wysox, Pennsylvania, altitude 700 feet (Carey); Wall, Pennsylvania, altitude 800 feet (Seal); Franklin county, Ohio, altitude 750 feet (Werner); Cincinnati, Ohio, altitude 500 feet (Lloyd); Hanover, Indiana, altitude 1000 feet (Barnes); Mt. Carmel, Illinois, altitude 450 feet (Schneck); Knoxville, Tennessee, altitude 1000 feet (Kearney); Caldwell county, North Carolina, altitude 2500 feet (Heller); Roanoke, Virginia, altitude 1000 feet (Britton); Marion, Virginia, altitude 2100 feet (Miss Vail); Cumberland Mountains, southeastern Kentucky, altitude 1000–2000 feet (Kearney); Mercersburg, Pennsylvania, altitude 750 feet (Porter).

Notes on some of the rarer Species of Polygonum.

By John K. Small.

(Plate 224.)

Some observations on the specimens of *Polygonum*, in the Herbaria of Prof. T. C. Porter, at Lafayette College, Mr. E. P. Bicknell and the Academy of Natural Sciences at Philadelphia, as well as the Herbarium of Columbia College, lead to the recording of some notes on the rarer species. These I have thought best to arrange and print in the following form, in advance of the publication of my monograph on the North American species of the genus.

Polygonum Newberryi Small, Bull. Torr. Club, **21**: 170 (1894).

The following Western collections should be referred to *P. Newberryi*: E. Hall, No. 446, collected in 1871; T. J. Howell, Mt. Hood (6,000–8,000 ft.), collected in August, 1881; E. C. Smith, No. 747, Mt. Ranier, Washington, collected August, 1890.

It may be interesting to note in this connection that glabrous forms of the above are related to *P. Davisiæ* of California, while the tomentose plants approach *P. sericeum*, of Siberia, in aspect.

Polygonum emersum (Michx.) Britton, Trans. N. Y. Acad. Sci. **8**: 73 (1889).

Polygonum rigidulum Sheld. Bull. Geol. and Nat. Hist. Surv. Minn. 9: 14. *t. 1* (1894).

Mr. Sheldon has evidently been misled, in describing a form or state of *P. emersum* under the name *P. rigidulum*, by not being sufficiently acquainted with the former plant. I have examined between one and two hundred specimens of *P. emersum* from all parts of North America, and cannot see that the characters assigned to *P. rigidulum* have any specific value. His distinguishing points are "larger size, aquatic habitat, the geniculate, branching, tumid stems and the obcuneate, almost glabrous, obliquely attached leaves." In the first place, *P. emersum*, like the other two members of the same group, *P. amphibium* and *P. Hartwrightii*, is very variable, although an exceedingly good species, and secondly, about one-half of the specimens I have examined

possess all or some of the characters assigned by Mr. Sheldon to the proposed species, and the others show them in a greater or less degree.

After some years of observation on this and other species of *Polygonum*, I would not place much value in size, for some of our common species under certain conditions grow but two or three inches tall, while again we find them elongating to six feet. As to the aquatic habitats, at all the localities where I have met with *P. emersum*, I have found it ranging from almost dry ground to one or two feet of water, both in swamps, quiet margins of lakes and rivers and in fairly swift running currents. The amount and manner of branching, as well as the tumidity of the internodes, depends on the size and strength of the plants. The shape of the leaves and the amount of pubescence are of little or no value, for the same patches produce variously shaped leaves as well as a great variation in the length of the petioles, and some plants may be glabrous while others are entirely covered with strigose pubescence.

The specimens distributed from the collections of the University of Minnesota as *P. emersum* differ more from the usual state of that species than do the ones sent out as *P. rigidulum*, and I have seen but one other specimen that corresponds with them. This was collected in Scott's Bluff county, Nebraska, by Rydberg, No. 349.

POLYGONUM PUNCTATUM ROBUSTIOR n var.

Robust, of a rather dull green color, nearly glabrous. Stem erect, 4–7 dm. long, often with a long, creeping or horizontal base, more or less papillose, sometimes strigillose, leaves oblong or lanceolate, 3–17 cm. long, .5–4 cm. broad, paler on the lower surface than on the upper and strongly punctate, often crisped and undulate; ocreæ 1–1.5 cm. long, strigillose, fringed with long bristles, loose, mostly inflated about the nodes, sometimes opened obliquely at branching nodes; ocreolæ contiguous or imbricated entire, nearly naked; pedicels 3–4 mm. long; achene triquetrous, 3 mm. long, broadly-oblong, minutely granular but rather shining.

This variety is of aquatic habit, being characteristic of the borders of lakes, ponds and rivers. The creeping or horizontal bases often reach a length of three feet. The plants range from two to three times larger than the typical form and are showy on account

of the large white flowers which are about 6 mm. in diameter. The achene, besides being larger than in the normal form, is more distinctly granular and often rather dull, and I have found no lenticular ones on the plants at hand.

It ranges southward through the Atlantic States from Massachusetts, and occurs also in Mexico, Central and South America.

POLYGONUM LONGISTYLUM Small, Bull. Torr. Club, **21**: 169 (1894).

Since describing the above species I have seen specimens from New Madrid Co., Missouri (Bush, No. 177); New Orleans, Louisiana (Ingalls); Alexandria, Louisiana (Hale); Indian Territory (Palmer, No. 286).

POLYGONUM MEXICANUM Small, Bull. Torr. Club, **19**: 356 (1892).

In 1883 *P. Mexicanum* was gathered as far south as Camaron, Mexico, by J. N. Rovirosa.

POLYGONUM OPELOUSANUM Riddell; Small, Bull. Torr. Club, **19**: 354 (1892).

Since the writing of my last note concerning the above species* it has been found in Newton county, Missouri, by Mr. B. F. Bush in September, 1893. He records it as growing in swampy places and as being uncommon, and distributed it as *P. acre leptostachyum* (321), which form, however, it does not resemble. The plant is thus brought within the limits of our conventional Northern Flora, and, like various other Southern species, it follows the Mississippi River Valley as far north as the swamps of southeastern Missouri. The specimens of this collection are very much like the type, both in their external appearance as in the very slender build, the strict and erect branches and the numerous and linear leaves, and in the minute characters of the achene, the flowers and the strongly and conspicuously fringed ocreolæ.

POLYGONUM SETACEUM Baldw.; Ell. Bot. S. C. & Ga. **1**: 455 (1817).

Heretofore confined to the Southern States, this form has lately been collected at three different stations within the bounds of the Northern Flora. Mr. Bush made two collections (114, 118) of it in Dunklin county, Missouri, in September, 1893. In the same month and year Mr. H. Eggert found the plant in Butler county,

* Bull. Torr. Club, **21**: 168.

southeastern Missouri, growing in the swamps of that region. This, like the preceding, follows the Mississippi River northward, and also shows the same variation in the amount and strength of the strigose pubescence as do the Southern individuals of this species.

POLYGONUM PERSICARIOIDES H.B.K. Nov. Gen. 2: 179 (1817).

This species has been found within the limit of the Northern Flora by Mr. H. J. Webber on the Dismal River, Nebraska. The specimens of the collection are not numbered, but are dated July 14, 1889.

POLYGONUM CAREYI Olney, Proc. Prov. Franklin Soc. 1: 29 (1847).

There is an unnamed specimen of the above, lying in the Herbarium of the Academy of Natural Science at Philadelphia, collected by Dr. Pitcher at Fort Gratiot, Michigan. No date is given, but the specimen was evidently found a number of years before the originals of Olney were collected.

POLYGONUM BOREALE (Lange).

Polygonum aviculare L. var. *boreale* Lange, Consp. Fl. Grœnl. 105 (1880).

Annual, glabrous, herbaceous and somewhat fleshy. Stem ascending 1–2 dm. long, simple or sparingly branched; leaves obovate, oblong or elliptic-obovate, 1–3 cm. long, .5–1 cm. broad, obtuse, slightly papillose, somewhat acuminate at the base, short-petioled, mid-rib alone prominent; ocreæ oblique 5–7 mm. long, silvery or brownish, only slightly lacerate; axillary clusters 2–5 flowered; pedicels slender; 3–4 mm. long, 5-parted to below the middle, calyx 4 mm. long, segments obtuse, light green, with white or cream-colored borders inclined to be open; stamens 6, included; filaments short and stout; style 1 mm. long, 3-parted to the base; achene ovoid, 3.5 mm. long, triquetrous, somewhat pointed, dull and striate-reticulated. (Plate 224.)

I have now seen this form from two Greenland collections and can not find any characters that warrant its disposal as a variety of *P. aviculare*.

The general character of the plant is different from that species, and the diagnosis as given above will serve to separate it. One of the best distinctions is in the fruit. *P. aviculare* has a pyramidal-ovoid achene, whereas that of *P. boreale* is simply ovoid and

twice as large. We have the plant from two stations in Greenland, Fgaliko (Rosenvinge) and Christianshâl (A Hartz) July, 1890.

Since writing the above a sheet from the Meisner Herbarium has been seen which bears a specimen of the above collected in Iceland by Mr. Ed. Jardin in 1866, and on the label Meisner has written a name which, however, like a number of other manuscript names, he never published.

POLYGONUM RAMOSISSIMUM PROLIFICUM Small, Bull. Torr. Club, **21**: 171 (1894).

I described this variety with some hesitation from specimens from a single locality in Nebraska. Since then the same form has been found by Prof. A. S. Hitchcock, at Olathe, Kansas, and by Mr. E. P. Bicknell, at York Harbor, Maine. These collections, although smaller than the type, are otherwise almost identical.

POLYGONUM EXSERTUM Small, Bull. Torr. Club, **21**: 172 (1894).

Collections have recently been made extending the range of this lately described species. They are as follows: Numerous stations within the influence of brackish water north of New York city (Bicknell); Woodbridge, New Jersey (Lighthipe); Atchinson, Nebraska (Bush); distributed as *P. ramosissimum*, number 329 and Saskatchawan (Bourgeau). The latter is an old collection made in Paliser's British North American Exploring Expedition, during 1857–8, distributed as *P. aviculare* var., and placed provisionally by me under *P. ramosissimum* in my Preliminary List of American Species of Polygonum.

POLYGONUM SAWATCHENSE Small, Bull. Torr. Club, **20**: 213 (1893).

Plants almost identical with the type of *P. Sawatchense* are preserved in the Herbarium of Lafayette College. They were collected in the mountains near Bridger Butte, Wyoming, on July 7, 1873, by Prof. T. C. Porter, and represent the fleshy, reduced and scurfy state this species assumes at high altitudes. The more elongated and wiry form has also been found in 1892, at Custer, in the Black Hills of South Dakota, by Mr. P. A. Rydberg (No. 983).

POLYGONUM TENUE Michx. Fl. Bor. Am. **1**: 238 (1803).

Polygonum microspermum Sheld. Bull. Geol. and Nat. Hist. Surv. No. 9, 70 (1894), not Small.

Polygonum tenue var. *microspermum* Sheld. l. c., not Engelm.

Polygonum Engelmanni Sheld. l. c., not Greene.

Specimens of *P. tenue* from Minnesota have lately been erroneously referred to *P. microspermum*,* and to avoid further confusion of the geographical range of the latter species, I take this means of correcting the mistake. Taking into consideration the fact that *P. microspermum* is a characteristic plant of the highest mountains of Middle Colorado, where it has been collected only two or three times and at stations not widely separated, and then taking into consideration the laws of geographical and altitudinal distribution, we should not expect to find the species at a comparatively low altitude in Minnesota. Further, an examination of the specimens on which Mr. Sheldon based his determinations shows them to lack all the essential characters of *P. microspermum*, and to possess all the essential characters of *P. tenue*. Selecting a few of the more prominent characters, we see that *P. microspermum*, like *P. Douglasii*, has a flat leaf. *P. tenue* has leaves with two lateral impressions on either side of and parallel with the midrib. They also differ much in shape from those of *P. microspermum*. The pedicels of the latter species are slender and deflexed, even in flower, whilst those of the former are short (sometimes almost wanting), stout and always erect. The acnene of *P. microspermum* is oblong or oblong-ovoid, smooth and shining; that of *P. tenue* is strictly ovoid, granular on and about the angles, smooth and shining only at the centres of the faces. The Minnesota specimens referred to, collected in Chippewa county, possess all these characters of *P. tenue*, and others, into whose details it is unnecessary to enter, as the manner of branching, the texture, flowers, ocreæ, etc.

POLYGONUM CRISTATUM Engelm. & Gray, Bost. Journ. Nat. Hist. 5: 259 (1847).

Only three stations for this rare and interesting species were known up to this season. Two of these were about Aiken, South Carolina, while the original was in Texas. While collecting in Middle Georgia this season I met with the plant, first at various points on the slopes of Stone Mountain, and subsequently encountered it in the Yellow River Valley and about Logansville. This

* Bull. Geol. and Nat. Hist. Surv. Minn. 9: 70.

discovery was not a surprise, as this region is between the former known localities. However, several days ago, Mr. Bicknell placed his collections of *Polygonum* for the past season at my disposal, and to my great surprise I find that he has secured *P. cristatum* from two stations in the Moshaloo Woods, near Riverdale, New York.

POLYGONUM CUSPIDATUM Sieb. & Zucc. Pl. Japon. Fam. Nat. 2: 84 (1846).

This Japanese species is gradually establishing itself in our Eastern States. It has become naturalized about Philadelphia, Pa., and Schenectady, N. Y., and during the present season Mr. T. H. Kearney, Jr., has found it established at Atlantic Highlands, New Jersey.

Three species, *Polygonum polycenemoides*, *P. setosum* and *P. equisetiforme*, natives of Eastern Europe, Western Asia and Northern Africa, have been found established by Mr. Bicknell, in the ruins of the Yonkers Carpet Mill. The fruit has been introduced from the above cited region in wool which was used at the mill. These species are the kind that take a firm hold in such situations as they are now growing in at Yonkers, whence they may spread and eventually become naturalized.

Some new Florida Plants.

BY T. H. KEARNEY, JR.

SCUTELLARIA INTEGRIFOLIA MULTIGLANDULOSA n. var.

Differs from typical *S. integrifolia L.* in the shorter stems with longer, more spreading and more glandular pubescence, in the obovate or oblanceolate upper leaves, which are less diminished and bract-like above, so that the inflorescence has a less racemose character, in the longer and more glandular pedicels, in the more glandular calyx and in the larger lower lip of the shorter, more ringent corolla.

Collected by Dr. Boykin in "the low country of Georgia;" by Chapman in Florida; by Rugel in 1843 near St. Mark's, in the same State, and by Mr. George V. Nash in 1894 near Eustis.

TRICHOSTEMA SUFFRUTESCENS n. sp. Root stout, ligneous; stem woody at base, erect 2.5–5 dm. high, branching from near the base, very leafy, canescent, densely glandular-puberulent towards the summit; leaves opposite with smaller ones fascicled in the axils, short-petioled, blade 1 cm. long and about one-half as wide, the uppermost much reduced and bract-like, oblong-ovate or obovate, wedge-shaped at base, rounded and sometimes slightly emarginate at apex, thickish, obscurely punctate, margin ciliate, both surfaces minutely glandular-puberulent; veins, except the midrib, obscure; flowers on slender, recurved, glandular pedicels in panicled, one-sided racemes; calyx strongly oblique, slightly puberulent and covered with shining glandular grains, bright green, veins conspicuously reticulated, upper three teeth about twice longer than the two lower ones, all acute; corolla strongly bilabiate, bright blue; filaments 20–25 mm. long, closely coiled; nutlets gray-brown, obovoid, about 1.5 mm. in longest diameter, rugose-reticulated, reticulations small and shallow.

Nearest to *T. dichotomum* L., from which our plant differs in the woody base of its stem, in the shorter-petioled and smaller leaves, in the finer and more glandular pubescence of stem and calyx, in the much longer filaments (10–15 mm. long in *T. dichotomum*) and in the smaller and darker nutlets, which are less deeply reticulated, with smaller and rounder areolæ. Resembles in habit *T. Arizonicum* A. Gray, but the irregular corolla places it in Section *Streptopodium* Benth.

Collected at Eustis, in 1894, by Mr. George V. Nash (Number 625).

PLUCHEA FŒTIDA IMBRICATA n. var. Perennial from a stout, somewhat woody rootstock; stem herbaceous, erect, 8–24 dm. high, branched towards the summit, angled, striate, cinerous-pubescent, also resinose-granular above; leaves thick, firm, dull green, lower 5–6 cm. long, 2–2.5 cm. wide, upper much reduced, clasping by the short auriculate base, ovate-oblong to triangular-ovate, broadest at base, mucronate at apex, coarsely and unevenly dentate-serrate with rigid callous teeth, upper surface glandular-puberulent, lower surface more densely so, veins reddish-brown, prominent on the under surface; heads 7–8 mm. high on short, stout, pubescent peduncles, in dense, cymose, rounded clusters which are subtended by two to four small, bract-like leaves and are borne at the summit of short or sometimes greatly elongated branches from the axils of the upper leaves; involucral scales reddish brown, glandular-puberulent, imbricated in 4–6 rows, the outermost short, ovate-oblong, rounded at summit, the innermost

much longer, linear-lanceolate, subulate-acuminate; flowers rose-colored, the hermaphrodite few or many in the centre of the head, the corolla resinose-granular towards the throat; anther tips exserted; achenes hispidulous.

Differs from typical *Pluchea fœtida* (L) B. S. P., in the following particulars. The stem is usually taller and stouter. The leaves are thicker and firmer, broader at base, the uppermost triangular-ovate. The axillary branches on which the clusters of heads are borne are usually very short, giving the whole inflorescence a racemose appearance, but are sometimes elongated as in ordinary *P. fœtida*. The clusters are very dense, the peduncles of the heads being short. The heads are somewhat larger and the involucre much more imbricated. The scales are deeper colored and more pubescent, the outer shorter, broader and more rounded.

Collected at St. Mark's, Florida by Rugel in 1843, and by Mr. George V. Nash (No. 1434) near Eustis, Florida, in 1894. Grows at the margins of lakes in grassy, swampy ground. Flowers in July and August. May prove to be a distinct species.

TEUCRIUM NASHII n. sp. Perennial, herbaceous; stem 6–9 dm. high, erect, branching above, four-angled, deeply sulcate, canescent with a fine, appressed pubescence; leaves short-petioled, blade 4–10 cm. long, 1–3 cm. wide, oblong to ovate-lanceolate, acute at both ends, closely and evenly serrate, dark green and minutely appressed-pubescent above, densely white-tomentose beneath, veins prominent on the lower surface; calyx white-tomentose, three upper teeth short triangular-ovate, the middle one slightly longer, acute, the others rounded, two lower teeth considerably longer, triangular-lanceolate, rather abruptly subulate-acuminate to almost mucronate; corolla minutely glandular-puberulent; nutlets brown, reticulated, areolæ shallow.

Resembles *T. Canadense*, from which it differs in the finer pubescence of every part, in the darker green upper surface of the leaf, in the densely white-tomentose under surface, in the broader and more rounded upper teeth and the more abruptly pointed lower teeth of the white-tomentose calyx, and in the rather larger and less deeply reticulated nutlets.

Collected in middle Florida in 1836, by Dr. Chapman; in Duval county, Florida, by Mr. A. H. Curtiss (No. 1975), and near Eustis, Florida, in 1894, by Mr. George V. Nash (Numbers 1496, 1505 and 1516).

PHYSALIS ARENICOLA n. sp. Plant light green; stems 2–4 dm. high, erect from long slender* branching rootstocks, much branched, slender, striate, pubescent with simple hairs, some minute and usually glandular, others longer, two or three jointed and non-glandular, often glabrate with age; leaves in pairs, one usually smaller, petioled; petioles 1–3 cm. long, slender, puberulent; blade 1.5–6 cm. long, 1.5–4 cm. in greatest width, ovate or ovate-oblong, irregularly and not deeply undulate or angulate-dentate, obtuse at apex, truncate or subcordate and unequal at base, appressed-ciliate, upper surface puberulent on the veins, lower surface appressed-pubescent chiefly along the veins, veins rather conspicuously reticulated below; flowers axillary, on slender pubescent pedicels as long as or longer than the petioles; flowering calyx pubescent with both long and jointed and minute, simple, glandular hairs, 7–8 mm. long, teeth triangular, acute, nearly as long as the tube; corolla rotate-campanulate, about 15 mm. in diameter in the throat, minutely ciliate, light yellow with a brown-purple center; anthers yellow; fruiting calyx about 3 cm. high, rather narrowly pyramidal-ovate, teeth many times shorter than the tube, with margins often darker colored, conspicuously reticulate-veined, minutely pubescent on the veins and margins of the teeth; berry light yellow.

Physalis arenicola is most nearly allied to *P. Virginiana* Mill., but presents several well-marked characters which distinguish it from that species. The pubescence is much finer and less glandular. The stems are more slender. The leaves are smaller, more regular in outline, on more slender petioles, less deeply toothed, never acuminate, the upper surface nearly glabrous, the lower minutely pubescent, the pubescence mostly confined to the veins. The flowering calyx is much less hairy. The calyx in fruit is glabrous save on the veins and margins of the teeth. The corolla is quite glabrous, except for the ciliate margin. The whole plant is greener and more delicate in every way than *P. Virginiana*.

Collected in light sandy soil along railroad embankments near Eustis, Florida, in 1894, by Mr. George V. Nash (Numbers 154, 170, 1059, 1170). Flowers from March to July.

ARISTOLOCHIA NASHII n. sp. Root a cluster of long, slender fibres from a short knotty rootstock; stems 10–22 cm. long, single or two or three from the same rootstock, simple or sparingly branched, erect, slender, flexuous, rather sparingly pubescent with

* One plant out of about forty examined has the rootstock considerably thickened.

short, lax, white hairs, leafy above, upper internodes about equal in length, each departing from the next lower at an angle of about 45 degrees; petiole pubescent, 1–3 mm. long, standing at right angles to the internode above; blade of leaves thin, margin ciliate, upper surface dark green, lower surface somewhat paler, both sparingly appressed-pubescent, especially on the rather prominent veins, in the lowest leaves often short-ovate and cordate, in the upper 2–5.5 cm. long, 5–10 mm. in greatest width, linear to oblong-lanceolate, tapering from below the middle to the obtusish apex, base narrowly sagittate to deeply auriculate with both lobes equal or with one longer; peduncles one to four near the base of the stem, 1–3 cm. long, slender, villous-pubescent, especially towards the summit, bearing two to five minute, pubescent bracts, one-flowered; calyx pubescent, brown-purple, the tube 10–12 mm. long, the limb about 1 cm. in diameter, reticulate-veined; immature capsule villous, especially upon the ribs.

Allied to *A. Serpentaria* L., but easily distinguished by the narrow leaves and very short petioles. Collected at Lake Ella, Florida, in 1894, by Mr. George V. Nash (No. 1139).

Rhus Blodgettii n. sp. Stem leafy, angled, striate, pubescent towards the summit, bark reddish-brown; leaves petioled, trifoliolate; petioles striate, pubescent, 2.5–4 cm. long; leaflets 3–5 cm. long, 2.5–3 cm. wide, ovate or ovate-oblong, short-acuminate, base rounded or acutish, entire, thick, coriaceous, upper surface dark-green, smooth and shining, lower surface paler with tufts of tawny hairs in the axils of the principal veins and at the base of the midrib, elsewhere quite glabrous, terminal leaflet on a petiolule 1–2 cm. long, lateral almost sessile; flowers in small, axillary, thrice compound panicles; calyx persistent, very small, 5-lobed, lobes acute; fruit a yellowish-white, shining drupe, subglobose, tipped with the rather stout base of the style, 2.5 mm. in longest diameter; stone ash-colored, 10–12 striate, minutely roughened.

Apparently an erect shrub, flowers not seen. Closely allied to *Rhus radicans*. It may easily be distinguished by the smaller, short-acuminate but not acute, thick and coriaceous leaflets, the upper surface shining and perfectly smooth, the lower surface pubescent only in the axils of the veins and at the base of the midrib, the margins not ciliate; and by the fruit, about half as large as that of typical *R. radicans*.

Rhus radicans has the upper surface of the leaf almost always pubescent at least on the midrib, the lower surface pubescent all over and the margins ciliate. A peculiar form from Sonora, Mex-

ico, collected by Schott, has the upper surface of the rather coriaceous leaflets entirely glabrous, but differs in other respects from *R. Blodgettii.*

The single specimen which I have seen was collected by Blodgett, at Key West, Florida. It is in the Torrey Herbarium.

Two new Genera of Plants from Bolivia.

By H. H. Rusby.

(Plates 225 and 226.)

*LOPHOPAPPUS.

Nat. Ord. Compositæ, tribe Mutisiaceæ.

Flowers of the head about 8, all alike, perfect; involucre cylindrical to slightly campanulate, the bracts 4–5-serialed, imbricated, appressed, oblong, keeled and aristate, serrate, cartilaginous, the innermost oblanceolate, sub-hyaline, cuspidate, ciliate, faintly papillose without; receptacle small, concave, papillose; corolla 2-lipped, the lips recurved, the lower 3-toothed, the upper 2-parted; anther-base sagittate, the acute lobes adherent, or with very short free tips, the elongated terminal appendages obtuse; style-branches short, thick, slightly spreading, the apex rounded; akene oblong-linear, inequilateral, 4- or imperfectly 5-costate, hispid; setæ of the pappus barbellate, at the summit tufted. A much branched shrub, with alternate, crowded, aristate, entire, coriaceous leaves, and small heads sessile and solitary at the ends of the branchlets.

Endeavor has been made to include this plant in *Proustia*, but it differs too greatly in its habit, its solitary heads, cylindrical, few-serialed involucre with different scales, the obscure anther-tails, short style-branches, and barbellate and penicillate setæ of the pappus.

Lophopappus foliosus.

Branches slender, erect, dark gray-brown, strongly striate, the branchlets tuberculated by the persistent bases of the fallen leaves; leaves 7–12 mm. long, scarcely 1 mm. broad (in the dried, involute state) oblanceolate, sessile, sub-aristate and pungent, strongly 3-ribbed, involute, thick, rigid, finely canescent above,

* I am indebted to my friend, Dr. Charles Rice, for the selection of this very expressive name.

sparingly hirsute and muricate below; heads partly concealed in the crowded leaves, 10–12 mm. long, 6–8 mm. broad, the rich brown pappus slightly exceeding the involucre and about as much exceeded by the flowers; corolla white, 7.5 mm. long, divided to the middle; anthers 4–5 mm. long, including the appendages, which are 2 mm. long; style-branches scarcely 1 mm. long, nearly one-half as broad; akene 3 mm. long, .5 mm. broad. (Plate 225.)

Collected by Mr. Bang in the vicinity of La Paz, altitude about 10,000 feet, 1889 (No. 66), and at Talca Chuguiaguilla, April, 1890 (No. 791).

FLUCKIGERIA.

NAT. ORD. GESNERIACEÆ (SUBTRIBE COLUMNEÆ.)

Calyx free, deeply 5-fid, hirsute, the segments entire, lanceolate, somewhat rigid, erect or the apex spreading. Corolla hirsute, the tube nearly straight, infundibuliform with contracted mouth and equal limb, the lobes whitish on the inner face, cartilaginous-thickened, short, inflexed, broadly imbricated. Stamens inserted near the base, included, the filaments distinct, pilose, slightly flattened at the base, a slight vestige of the fifth present, the anthers short, the cells parallel. Disk of 5 glands with 4 intermediate papillæ, the two posterior glands slightly larger, united, the other three short-acuminate, slightly notched at the apex. Ovary superior, with the placentæ of the sub-tribe, style included, stigma terminal, small, 2-cleft. Fruit not seen. Genus dedicated to Prof. Dr. F. A. Fluckiger, of Berne, one of the distinguished authors of the Pharmacographia.

FLUCKIGERIA FRITSCHI. Herbaceous, stems elongated, erect, simple, bright red, obscurely angled, pilose, the internodes twice the length of the ternate leaves, which are sub-sessile, 3–5 cm. long, 1.5–2.5 cm. broad, oval-ovate, the base rounded, very abruptly contracted into a very short petiole-like base, apex short acuminate, coriaceous, revolute, pallid, appressed-hirsute, purple-veined, one pair of nerves forming the narrow purple margin; pedicels solitary, short and stout; calyx 1.5 cm. long, the lobes acuminate, densely hirsute both sides with purple tips; corolla bright purple, densely hirsute, 2.5 cm. long, the lobes 3 times as broad as long; stamens reaching a little beyond the middle of the corolla, the filaments yellow, pilose, the anther-cells broadly oblong; ovary ovate-conical, hirsute like the style, which is shorter than the corolla. (Plate 226.)

Collected by M. Bang, Yungas, 1890 (No. 401), species dedicated to Prof. Dr. Karl Fritsch, who has kindly confirmed my diagnosis.

EXPLANATION OF PLATES.

PLATE 223. *Lophopappus foliosus* Rusby.

(1) Flowering branch, (2) inner scale of involucre, (3) flowering head, (4) outer scale of involucre, (5) flower, (6) three anthers, (7) upper part of style.

PLATE 224. *Fluckigeria Fritschi* Rusby.

(1) Flowering stem, (2) disk × 2, (3) calyx with ovary, (4) mouth of corolla laid open, (5) base of corolla with stamens, (6) pistil.

Cryptogamic Notes from Long Island.--II.

BY SMITH ELY JELLIFFE.

HEPATICÆ.

Frullania Eboracensis Gottsche.
Frullania Asa-Grayana Mont.
Radula complanata (L.) Dumort.
Porella platyphylla Lindb.
Aneura Pinguis (L.) Dumort.
Trichocolea tomentella (Ehrh.) Dumort.
Scapania nemorosa (L.) Nees.
Plagiochila porelloides Lindenb.
Pellia epiphylla (L.) Nees.
Marchantia polymorpha L.
Conocephalus conicus (L.) Dumort.
Riccia fluitans L.
Riccia natans L.

BROOKLYN, Sept. 20, 1894.

Botanical Notes.

Pistillody. The note in the last BULLETIN regarding pistillody in the Mandrake called to mind a very similar case at Racine, Wis., this last spring. A student in studying the *Podophyllum* discovered a stamen which was normal in all particulars except that one-half of the anther bore a stigmatic lobe, the nature of which was easily recognized by its color and convolution, which exactly imitated those of a true stigma. *Podophyllum peltatum*,

thus giving two cases in one spring in such widely separated places, may be justly regarded as being uncommonly susceptible to pistillody.

Staminody occurred freely on a birch tree (*Betula populifolia*), in the suburbs of Racine. The pistillate catkins bore stamens for a half inch or more from the end.

Teratology. Two items which seem worthy of record will be mentioned. A *Trillium grandiflorum* was found in which a stamen and a petal were united edge to edge, one anther cell being obliterated by the union. It did not seem to be a case of reversion, as only the normal number of petals were present. A *Rheum Rhaponticum* stamen was seen which bore on its apex the filament of another stamen. This second stamen was perfect, and, in every observable detail, like any other in the flower. This occurrence of stamens, "tandem," as it were, reminds one of the prolification of the rose, giving one peduncle from the centre of another flower, but any such phenomenon among stamens has never come to my notice before.

F. L. Stevens.

Syracuse, N. Y., July 12, 1894.

Algæ Exsiccatæ. The undersigned have made preparations for the issuing of sets of dried specimens of the North American Algæ, both of the fresh and of the salt waters, for the aid of investigators and to assist in the development of a better knowledge of the North American species. Contributions of sets of 80 specimens each are solicited.

Frank S. Collins,
William A. Setchell,
Isaac Holden.

All interested are requested to address Frank S. Collins, 97 Dexter St., Malden, Mass.

Lemna Valdiviana Philippi. I have collected and floated out a large number of sheets of the *Lemna Valdiviana*, recently discovered by Dr. Geo. G. Kennedy in Randolph, Mass. As the station is an interesting one, the plant will be desired by botanists, and I shall be glad to send it to anybody who may ask for it.

Walter Deane.

9 Brewster Street, Cambridge Mass., November, 1894.

ULMARIA ULMARIA (L.) (*Spiræa Ulmaria* L. Sp. Pl. 490 (1753). *Ulmaria palustris* Mœnch, Meth. 663 (1794).)

This plant was collected by me during the past summer at Trois Pistoles, in the province of Quebec. It was growing by a wire fence near the track of the Intercolonial Railway and was quite wild. There is a specimen of this species in the Herbarium of Columbia College, collected by W. M. Whitfield at Lenox, Mass., July 11, 1889. Who can furnish information of other American localities?

Curiously enough, the binomial used above appears not to have been published before. JOHN HENDLEY BARNHART.

TARRYTOWN, N. Y., October 5, 1894.

The Columbia College Herbarium has within the last month been re-arranged, the families now following the sequence of Engler and Prantl's "Natürliche Pflazenfamilien;" the genera will gradually be placed in the sequence of that work as the volumes are completed. The advantages of this system are: (1) The indications it affords of the phylogeny of the groups. (2) The convenience of having the arrangement of the whole collection based on one set of volumes. The mechanical work of moving several hundred thousand mounted sheets appeared at first to be very considerable, and as the space available for stacking is limited, we delayed the work long after we had decided to undertake it, but it has really been accomplished with ease and rapidity, and we are confident that much has been gained. The "Natürliche Pflanzenfamilien," having appeared so very recently, contains many more genera of Spermatophyta than Bentham and Hooker's "Genera Plantarum," and a great many specimens which in some herbaria have been placed at the ends of the orders and in others interspersed through the generic sequence will now find their place in the series.

Of course no student will be willing to accept all the generic limitations of Dr. Engler's books any more than he was willing to accept all of Bentham and Hooker's, but the recent publication of the former gives it a distinct advantage. It is to be hoped that a generic index to the whole work will be printed.

N. L. BRITTON.

Reviews.

*A Monograph of Lichens.**—Probably the first thought that suggests itself to the student on perusing this book is, Why was it ever published? It certainly is to be regretted that any one should at this time make such efforts to darken a field of learning that is so much in need of light as lichenology. Part I. of the work has made its appearance. The author has attempted to classify the British Museum material. This in itself was certainly a commendable undertaking, nor can any very serious objections be raised against the system of classification adopted, which is essentially that of Nylander; but no one can now be excused for refusing to recognize the true nature of the lichen structure. The author recognizes the algæ of lichens as "gonidia" of older authors, and groups them into three kinds, "gonidia, gonidimia" and "gonimia." Gonidia are defined as "the green cells of the thallus;" gonidimia as "green cells smaller than gonidia and with the cell wall less distinct;" gonimia, "bluish-green naked granules."

One would naturally conclude that an English scholar would or could understand and use the English language, but such does not seem to be the case. To illustrate, I will cite a few more definitions, before criticising the general phraseology of the body of the work. "Applicate" is defined as "forming the thalline border in many crustaceous lichens." "Evanescent—Reduced to mere gonidia scattered over the substratum;" "Nuclear—Roundish with an apical pore." These definitions become somewhat intelligible after a careful reading of the text. The author's peculiar Latino-Anglo-phraseology was no doubt the result of a long continued study of Nylander's classical works on lichens. Here is a sample. Of *Collema leptogiella* he says: "Thallus effuse, thin, minutely subcoralloideo-furfuraceous, olive-brown, apothecia leptogioid, minute, lurid-testaceous, slightly margined, the epithecium somewhat impressed or at length subplane; spores ellipsoid or oblongo-

* A Monograph of Lichens found in Britain: being a descriptive Catalogue of the species in the Herbarium of the British Museum, by the Rev. James M. Crombie, M. A., F. L. S., F. G. S., etc. London, 1894.

ellipsoid, 0.010–17 mm. long, 0.005–7 mm. thick; paraphyses slender, or somewhat slender, thicker at the apices; hymenial gelatine tawny, wine-reddish with iodine." This certainly is a mixture and thus it continues through the entire book.

The figures are fairly good from an artistic point of view, but unfortunately various lichen structures are incorrectly named. The algæ are, of course, never rightly named. In *Nephromium lævigatum* he has evidently designated as "sterigmata" and "spermatia" the hyphal cells surrounding the algal groups.

There is one redeeming feature in the author's work, and that is the faithful application of chemical tests to, I believe, every species of lichen examined; and by this feature alone the work may perhaps live. The tests are simple and easy of application. They are essential to a more reliable method of determining species.

ALBERT SCHNEIDER.

COLUMBIA COLLEGE.

Flora of the outlying Carboniferous Basins of Southwestern Missouri. David White (Bull. 98, U. S. Geol. Surv. Pamph. pp. 139, *pl. 1–5*. Washington, 1893).

This flora is of special interest biologically in view of the fact that it must have grown at an altitude several hundred feet above the old marshes which now constitute the coal fields of northern Missouri and eastern Kansas. It represents essentially an upland flora as compared with that of the semi-inundated areas mentioned. It is particularly characterized by the presence of Neuropterid ferns and the leaves of *Cordaites*.

Neuropteris Jenneyi, N. caudata, Sphenopteris Lacoei and Pecopteris (*Asterotheca*) *Lesquereuxii* are described and figured as new species.

Each species described is accompanied by a complete synonomy and bibliography, arranged in chronological sequence, followed by critical notes on relationship, etc. From a study of the distribution of the species determined the author concludes that the plant-bearing beds belong to the Lower Coal-measures, and from their occurrence, in small basins in eroded limestone, the approximate age of the lead and zinc ores occurring in the limestone is estimated. Inasmuch as the palæobotanist is often

criticised by the botanist for publishing descriptions founded upon material which the latter considers fragmentary and defective, the following paragraph from the work is quoted in order to show the point of view of the former: "Any impression that possesses a character which marks it as different from all other impressions and as peculiar to a horizon or series merits a characterization sufficient for its complete distinction; for its value in identifying that horizon within certain limits is equally important, whether it be a good species to the eye of the systematic biologist, or only the track of an otherwise unknown organism." In other words, accuracy of description and location is the first essential. Systematic position is only incidental; and to those who appreciate the value of palæobotany in the correlation of strata and the determination of geological horizons this statement of the case appeals most forcibly.

A. H.

A New Ilysanthes.—While botanizing in the lowlands of southern Missouri this summer, my attention was attracted by a form of *Ilysanthes* that appears to have escaped the notice of botanists generally. It was so unlike anything I had ever seen that I was constrained to observe it more closely at the different localities I collected in, and I found that it is the prevailing form of southeastern Missouri; at least I observed it in Dunklin, New Madrid, Stoddard, Scott and Cape Girardeau counties. In aspect it is the exact opposite of *I. gratioloides*, and may be characterized as follows:

Decumbent, low and spreading bushy annual; leaves round-ovate or oblong-ovate, thinnish, very veiny, serrate, or often coarsely dentate, all of them petioled, the lower quite long-petioled; pedicels thickish, less than 12 mm. long, and much shorter than the leaves, and commonly two or three in the axils: flowers about 3 mm. long; capsule small, acuminate at apex; calyx-lobes setaceous, much longer than the capsules.

Although there seem to be sufficient characters present to maintain this as a species, for the present it may be designated as ILYSANTHES GRATIOLOIDES CURTIPEDICELLATA.

Differs from *I. gratioloides* mainly in having larger thin leaves which are petioled, shorter pedicels, longer calyx lobes, several pedicels in the axils, decumbent habit and in being slightly sca-

brous. *I. gratioloides* is usually strictly upright, with sessile, mostly entire leaves, the lower usually connate, pedicels solitary, filiform and much exceeding the leaves, sometimes even 36 mm. long, and has calyx lobes shorter than the capsules. B. F. BUSH.

INDEPENDENCE, MO.

Proceedings of the Club.

TUESDAY EVENING, OCTOBER 9TH, 1894.

Dr. Britton presiding and 26 persons present.

The following were elected active members; Miss Mary Foster, New York City; Miss Luella A. Palmer, New York City; Miss L. K. Lawall, New York City; Mr. Paul Schoeder, Hoboken, New Jersey; Mr. Edw. W. Berry, Passaic, New Jersey.

Prof. Dr. Alfred Cogniaux of Verviers, Belgium, was elected an honorary member.

The Committee on Coöperation of the Scientific Alliance with the Brooklyn Institute, for entertaining the A. A. A. S. at its Brooklyn meeting, reported that the Local Committee of Arrangements had requested that no demonstration be made in this city, but that all unite in making a success of the undertakings in Brooklyn, and that this request had been complied with.

It was unanimously resolved that the Curators request the College of Pharmacy of the City of New York to permit the local herbarium of the Club to be deposited in the herbarium room of the new College of Pharmacy building, and to allow the members of the Club access thereto, the College in return being permitted to use the Club herbarium.

The Secretary reported a request from Prof. Dr. Rees of Erlangen for specimens of American plants in the families Scrophulariaceæ, Gentianaceæ, Plantaginaceæ and Liliaceæ, which Prof. Rees is engaged in monographing, and announced that he would forward to Prof. Rees any such specimens which might be sent to him.

Dr. Britton announced the death of Mrs. Maria L. Daly, and eulogized the high services which she had rendered the cause of

Botany in starting and heading the ladies' movement for the establishment of the New York Botanical Garden, which had resulted in the resuscitation of the enterprise when it was virtually dead for the time being, and in making in her will a very handsome provision for its maintenance. It was unanimously resolved that a committee of three be appointed by the Chair to draft suitable resolutions in memory of the deceased. Judge Brown, Miss Vail and Mrs. Cowdin were appointed.

Mr. Van Sickle reported finding in Green Pond, N. J., two large patches of *Sparganium minimum* Fries, the floating stems being about four feet in length. This is the first definite record of the occurrence of the plant in New Jersey. Dr. Britton remarked that it was probably the most southern locality known for the plant. Mr. Van Sickle had also found in abundance a hybrid between *Verbena urticæfolia* and *V. hastata.*

Mr. Small had spent his time in Georgia and North Carolina in making field observations. He had endeavored to ascertain how the flora of similar elevations in the centers of the two States compared, and had found them very similar. A number of species heretofore supposed to be endemic in central Georgia had been found in North Carolina. He had collected many rare and several new species. Important facts concerning altitudinal distribution had been collected.

Interesting observations concerning the rapid spread of *Helenium tenuifolium* Nutt. were made, and also concerning the distribution of *Rhododendron maximum;* Miss Waterman reported having seen the latter at Sebago Lake, Maine, which is believed to be its most eastern locality.

Mr. Ogden reported having explored an uninhabitated region in Pike county, Pa., where the forest had been felled and had apparently smothered out many species before abundant, notably *Cypripedium pubescens. Gerardia flava* was the predominant plant in flower, covering acres with bloom. A specimen of *Peramium pubescens* having fifty flowers in bloom at one time had been seen. Abundantly represented species were *Habenaria ciliaris, Rhododendron maximum, Epigæa repens* and *Azaleas.* In Sullivan county, Pa., he had observed an injured branch of *R. maximum,* which bloomed September 7th.

Mrs. Britton reported having found five stations for *Schistostega osmundacea* in the Adirondacks, near Adirondack Lodge. She stated that *Ptychomitrium pygmæum* Lesq. and James is only *P. incurvum*.

WEDNESDAY EVENING, OCTOBER 31ST, 1894.

Vice President Allen in the chair and 20 persons present.

The following named persons were elected active members: Mr. T. S. Constantine, Jr., Miss Catharine Barker, New York City.

An invitation was received from the President of the New York College of Pharmacy, offering the Club the use of the Assembly Rooms of that institution on any evening mutually agreed upon, and also to inspect the new building. The invitation was gratefully accepted and the arrangements were referred to the Recording Secretary with power.

The Chairman reported some of the results of an examination of the Characeæ of Lake Champlain and Lake Saratoga during the summer. He had found the west side of Lake Champlain almost barren of these plants, but had collected a new form of *Chara sejuncta* and *Chara gymnopus elegans* in Great South Bay, an arm of that lake. The same two species were found in Lake Saratoga. He exhibited *Nymphæa rubrodisca* from Lake Champlain and *Bidens Beckii* from Lake Saratoga.

Dr. Britton reported the occurrence of Coltsfoot, *Tussilago Farfara*, near Garretson's, Staten Island, and remarked on the rarity of this plant in the area of the local flora, stating that it was reported many years ago by Dr. Knieskern from Monmouth county, N. J., and that he had himself once observed it near Port Jervis, in southern New York.

Mr. Barnhart reported the occurrence of *Alliaria Alliaria* near Hastings, N. Y.

The following announced papers were then presented:

"On wing-like Appendages on the Petioles of *Liriophyllum populoides* Lesq. and *Liriodendron alatum* Newb., with Description of the latter," by Arthur Hollick. (Published in this BULLETIN.)

"Notes on a Revision of the Genus *Scouleria* with Description

of a new Species," by Elizabeth G. Britton. (To be published in the December BULLETIN.)

"On the Affinities of the Calycanthaceæ, with Notes on the Family," by T. H. Kearney, Jr. (To be published in a subsequent issue of the BULLETIN.)

Index to recent Literature relating to American Botany.

Atkinson, G. F. Leaf Curl and Plum Pockets. Bull. N. Y. (Cornell) Exp. Sta. 73: 318–355. *pl. 1–20.* 1894.
Eight of the fifteen species of *Exoascus* figured are described as new.

Baker, J. G. New Ferns of 1892–93. Ann. Bot. 7: 121. Au. 1894.
Asplenium (*Diplazium*) *Cordovense* from Mexico collected by Hugo Finck is the only American species described.

Bastin, E. S. Economic Botany. Am. Journ. Pharm. **66**: 283–293. Je. 1894.

Bastin, E. S. Structure of *Geranium maculatum*. Am. Journ. Pharm. **66**: 516–522. N. 1894.

Bastin, E. S. Structure of *Heuchera Americana*. Am Journ. Pharm. **66**: 467–473. O. 1894.

Bastin, E. S. Structure of *Podophyllum*. Am. Journ. Pharm. **66**: 417–424. S. 1894.

Beal, W. J. Ruled Slides. Bot. Gaz. **19**: 416. 17 O. 1894.

Brandegee, K. Studies in Portulacaceæ. Proc. Cal. Acad. Sci. (II.) **4**: 86–91. *pl. 4.* 2 Je. 1894.
Contains descriptions of *Lewisia redeviva* var? *Yosemitana* and *L. Kelloggii*, the latter figured.

Brandegee, T. S. Two new Species of *Ilex*. Gard. & For. 7: 414. *f. 65–66.* 17 O. 1894.
Descriptions and illustrations of *Ilex Californica* and *I. triflora*.

Brown, N. E. *Hypocryta pulchra*. Gardn. Chron. **16**: 244. 1 S. 1894.
A new species from Columbia, prov. New Grenada.

Clinton, G. P. New Localities. Bot. Gaz. **19**: 415. 17 O. 1894.
Plants introduced in Illinois.

Coulter, Barnes and **Arthur, Editors.** Proceedings of Section G., A. A. A. S., Brooklyn meeting, 1894. Bot. Gaz. **19**: 362–382. 15 S. 1894.

Davenport, G. E. Filices Mexicanæ.—V. Bot. Gaz. **19**: 389–396. 17 O. 1894.

Enumeration of Pringle's collection of 1891–3. Describes *Asplenium rubinum* and *Polypodium petiolatum* as new and gives names to several varieties.

Davis, J. J. Two Wisconsin Fungi. Bot. Gaz. **19**: 415–416. 17 O. 1894.

Describes *Uromyces minimus* and *Doassansia ranunculina* as new.

DeCandolle, C. Meliaceæ Novæ. Bull. Herb. Boissier, **2**: 567–575. Au. 1894.

New American species described in *Guarea*, *Trichilia* and *Cedrela*.

Eckfeldt, J. W. Lichens new to North America. Bull. Torr. Bot. Club, **21**: 393–396. 29 S. 1894.

Describes eight new species from Mexico and one from Louisiana.

Engelhardt, H. Ueber neue fossile Pflanzenreste von Cerro de Potosi. Abh. Isis, **1894**: 3–13. *pl. 1.* 1894.

Includes descriptions of thirty-four new species.

Fairchild, D. G. Bordeaux Mixture as a Fungicide. Bull. Div. Veg. Path. U. S. Dept. Agric. **6**: pp. 56. Je. 1894.

Lists 33 injurious Fungi that have been treated.

Farlow, W. G. Note on *Agaricus amygdalinus* M. A. Curtis. Proc. Bost. Soc. Nat. Hist. **26**: 356–358. Au. 1894.

Farwell, O. A. Contributions to the Botany of Michigan. Asa Gray Bull. **6**: 35; **7**: 45. 1894.

Cardamine Pennsylvanica Brittoniana n. var. is described; many new localities for Michigan plants are recorded.

Galloway, B. T. The Journal of Mycology **7**: 4. Div. Veg. Path. U. S. Dept. Agric. 333–478. *pl. 32–38.* 1894.

Deals chiefly with methods of combating Fungi.

Gibson, R. J. Contributions towards a Knowledge of the Anatomy of the Genus *Selaginella*. Ann. Bot. **7**: 131–206. *pl. 9–12.* Au. 1894.

Groppler, R. Vergleichende Anatomie des Holzes der Magnoliaceen. Bibliog. Bot. **31**: 1–49. *pl. 1–4.* 1894.

Harvey, F. L. Contribution to the Lichens of Maine. Bull. Torr. Bot. Club, **21**: 389-393. 29 S. 1894.

Preliminary list of 115 species.

Hooker, J. D. *Salvia macrostachya.* Curt. Bot. Mag. **50**: *pl. 7372.* S. 1894.

Native of Ecuador.

Hooker, J. D. *Sobralia sessilis.* Curt. Bot. Mag. **50**: *pl. 7376.* S. 1894.
Native of British Guiana.

Hooker, J. D. *Trichocentrum tigrinum.* Curt. Bot. Mag. **50**: *pl. 7380.* O. 1894.
Native of Central America.

Jack, J. G. Native Trees and Shrubs about Montreal, Canada.—I.–V. Gard. & For. **7**: 383–384; 392; 403–404; 413; 423. 3–24 O. 1894.

Jelliffe, S. E. A further Contribution to the Knowledge of the Microscopical Organisms of the Brooklyn Water Supply. Brooklyn Medical Journal, **8**: 588–605. O. 1894.
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Kraemer, H. Fungi. Am. Journ. Pharm. **66**: 424. S. 1894.

Kuntze, O. Nomenclatur-Studien. Bull. Herb. Boissier, **2**: 456–489. Jl. 1894.

Kuntze, O., and **Jackson, B. D.** *Linnæa* or *Obolaria?* Journ. Bot. **32**: 276. S. 1894.

Lindberg, G. A. *Opuntia Darwinii* Henslow und *Opuntia Galapageia* Henslow. Monatss. Kakteenk. **4**: 121; 134. 20 Au. and 20 S. 1894.

Loesener. T. Plantæ Sellerianæ. Bull. Herb. Boissier, **2**: 533–566. *pl. 20.* Au. 1894.
New species are described in *Struthanthus, Phoradendron, Mascagnia, Malpighia, Gaultheria, Arctostaphylos, Tabernæmontana, Mandevillia, Marsdenia, Siphonoglossa* and *Tetramerium.*

Macoun, J. M. Contributions to Canadian Botany.—I. II. Can. Rec. Sci. 23–27; 76–88. Ja. and Ap. 1894. [Reprinted as Contr. Herb. Geol. Surv. Canada, I. II.]
Record of a number of new plants in the Canadian flora and of additional localities for others. *Epilobium clavatum* Trelease is described as a new species.

Magnus, P. Ueber die Gattung *Najas.* Ber. Deutsch. Bot. Gesell. **12**: 214–224. *pl. 11.* 31 Au. 1894.

Mauger, C. C. *Myrica asplenifolia* L. Am. Journ. Pharm. **66**: 211–219. My. 1894.

Meehan, T. *Aconitum uncinatum.* Meehan's Month. **4**: 81. *pl. 6.* Je. 1894.

Meehan, T. *Actinomeris helianthoides.* Meehan's Month. **4**: 129. *pl. 9.* S. 1894.

Meehan, T. *Hypericum densiflorum.* Meehan's Month. **4**: 97. *pl. 7.* Jl. 1894.

Meehan, T. *Pentstemon Cobæa.* Meehan's Month. **4**: 113. *pl. 8.* Au. 1894.

Micheli, M. Légumineuses nouvelles de l'Amérique Centrale. Bull. Herb. Boissier, **2**: 441–449. *pl. 9–14.* Jl. 1894.
Descriptions of *Dalea virgata, Gliciridia Guatemalensis, Cracca bicolor, Periandria parviflora, Erythrina Costa-Ricensis* and *Inga Pittieri.*

Porter, T. C. *Magnolia glauca.* Gard. & For. **7**: 398. 3 O. 1894.
Notes on a lost locality in Pennsylvania for *M. glauca* and the occurrence in western Pennsylvania of *Ilex opaca* and *Liquidambar Styraciflua.*

Pound, R. Comment on "The meaning of tree life." Bot. Gaz. **19**: 422. 17 O. 1894.

Purpus, A. Uber die winterharten Kakteen aus Colorado. Monatss. Kakteenk. **4**: 102. 20 Jl. 1894.

Rex, G. A. Notes on *Cribraria minutissima* and *Licea minima.* Bot. Gaz. **19**: 397–400. 17 O. 1894.

Rothrock, J. T. The Hemlock. Forest Leaves **4**: 169. O. 1894.
Illustrations of the trunk of *Tsuga Canadensis.*

Rothrock, J. T. White Pine. Forest Leaves **4**: 152. Au. 1894.
Illustration of the trunk of *Pinus Strobus.*

Rusby, H. H. The Rubber Industry in South America. Druggists' Circular and Chem. Gaz. **38**: 171. Au. 1894.

Sargent, C. S. A hybrid Walnut-tree. Gard. & For. **7**: 434. *fig. 69.* 31 O. 1894.
Description of *Juglans regia* × *cinerea* observed at Cambridge, Mass.

Sargent, C. S., Editor. The White Ash. Gard. & For. **7**: 402. *fig. 64.* 10 O. 1894.
Illustrating *Fraxinus Americana* in Pennsylvania.

Schrenk, H. Notes ou *Tubercularia pezizoidea* Schwein. Bull. Torr. Bot. Club, **21**: 385–389. *pl. 218.* 29 S. 1894.
Refers this species and *Hypocrea Richardsonii* to *Corticium.*

Schumann, K. *Phyllocartus Gœrtneri.* Monatss. Kakteenk. **4**: 105. 20 Jl. 1894.

Stokes, A. C. Notes on the Chromatophores of *Astrophyllum sylvati-*

cum Lindb. (*Mnium cuspidatum* Hedw.) and of some other Plants. Bull. Torr. Bot. Club, **21**: 396–406. *figs.* 29 S. 1894.

Thompson, M. A. The Flora of the Black Hills. Asa Gray Bull. **7**: 37, 38. 1894.

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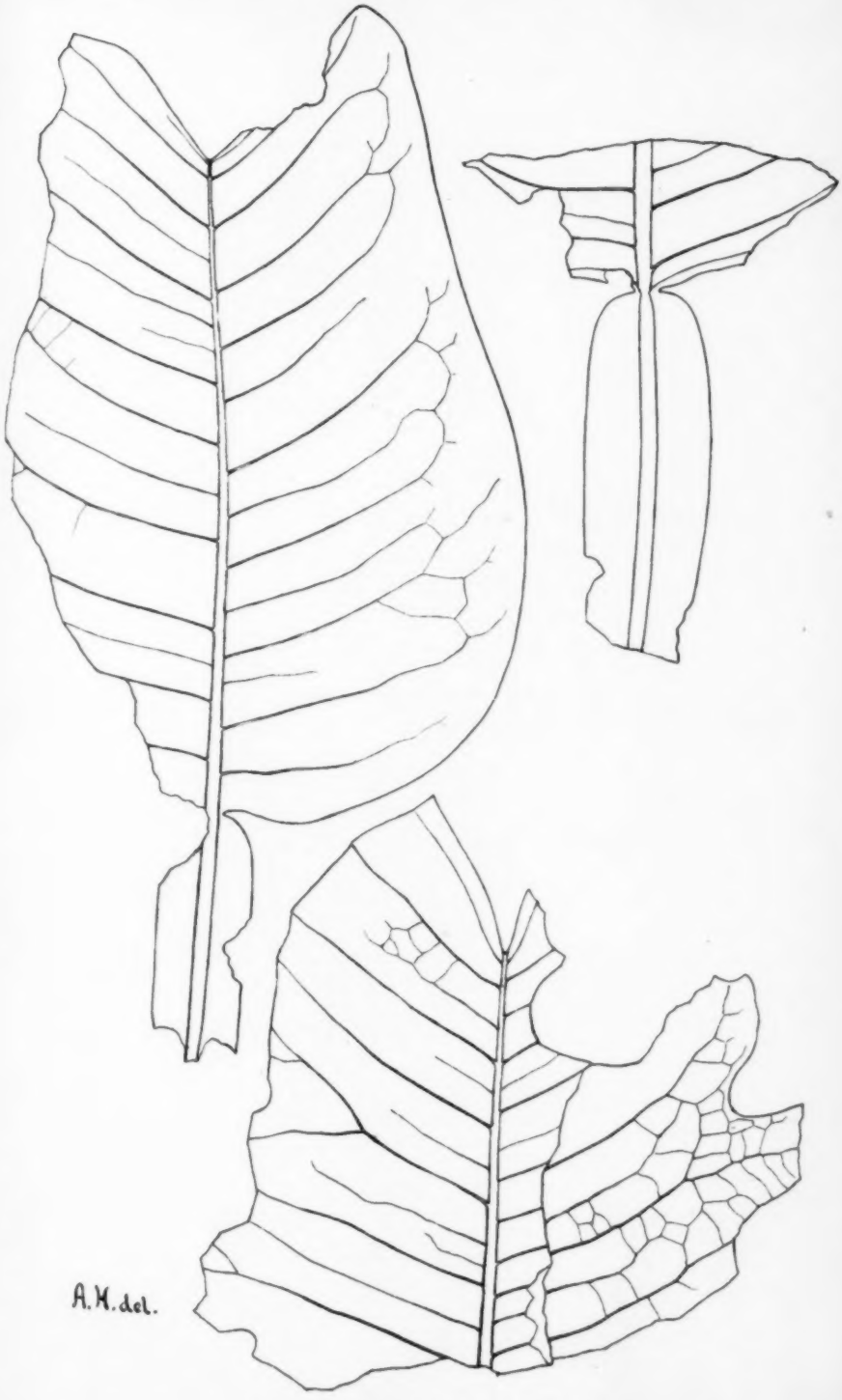
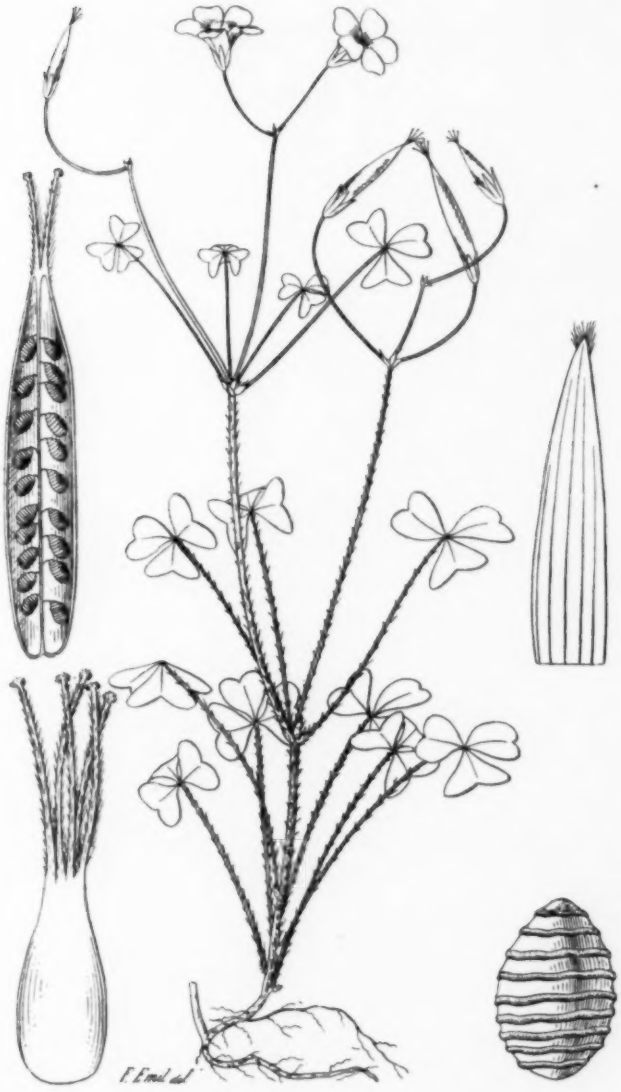
Whyte, R. B. (and others). Report of the Botanical Branch 1893. Ottawa Nat. **8**: 38. Je. 1894.



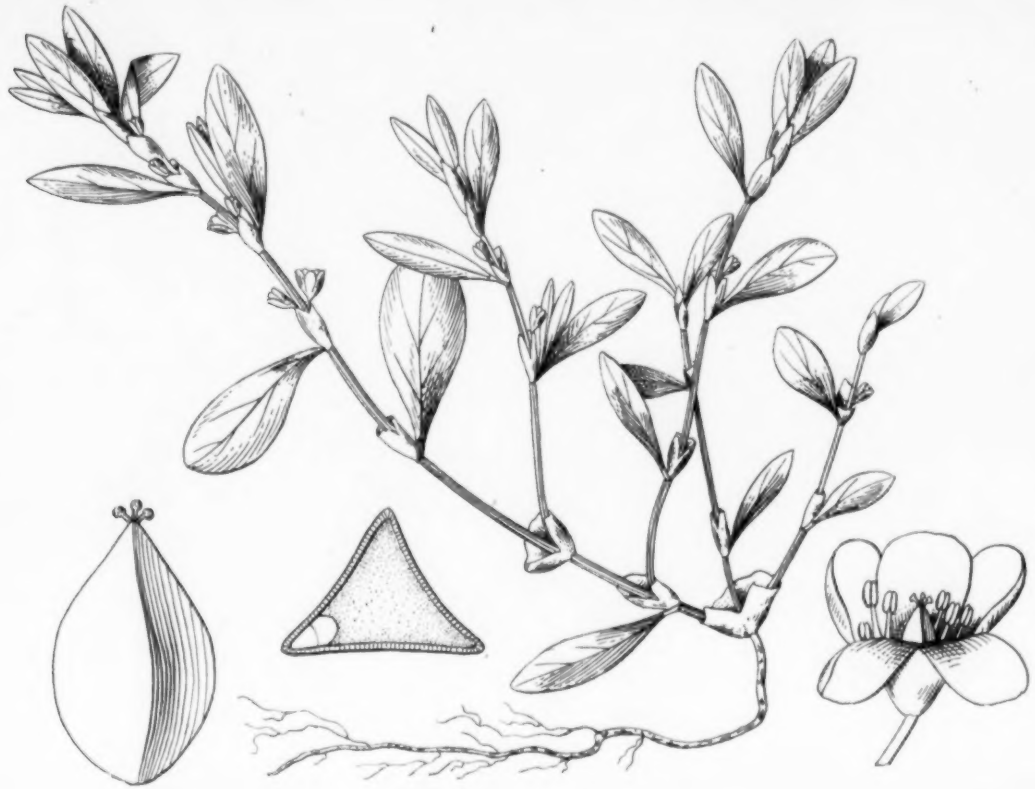
LIRIODENDRON ALATUM NEWB.

LIRIOPHYLLUM POPULOIDES LESQ.

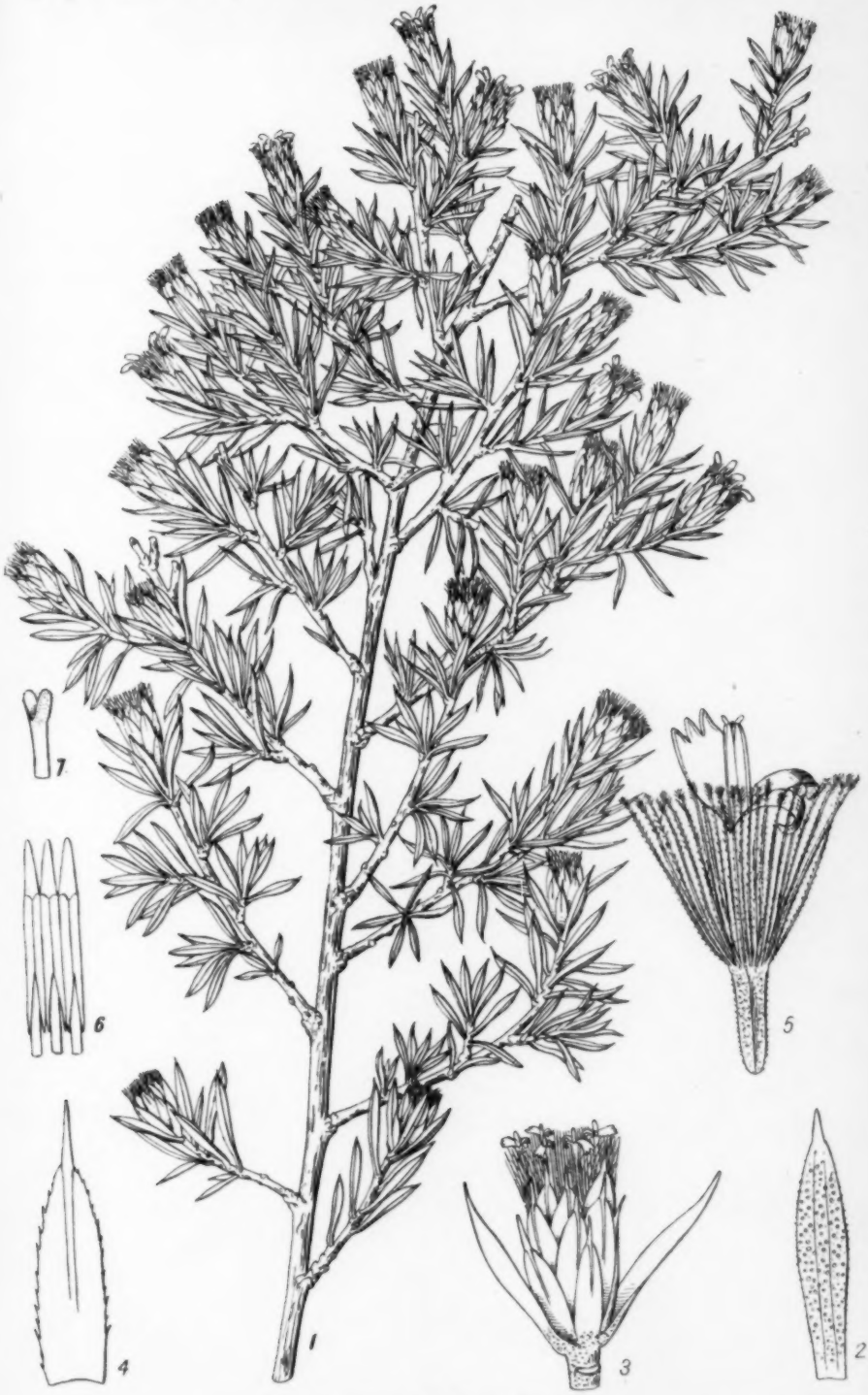


OXALIS RECURVA ELL.

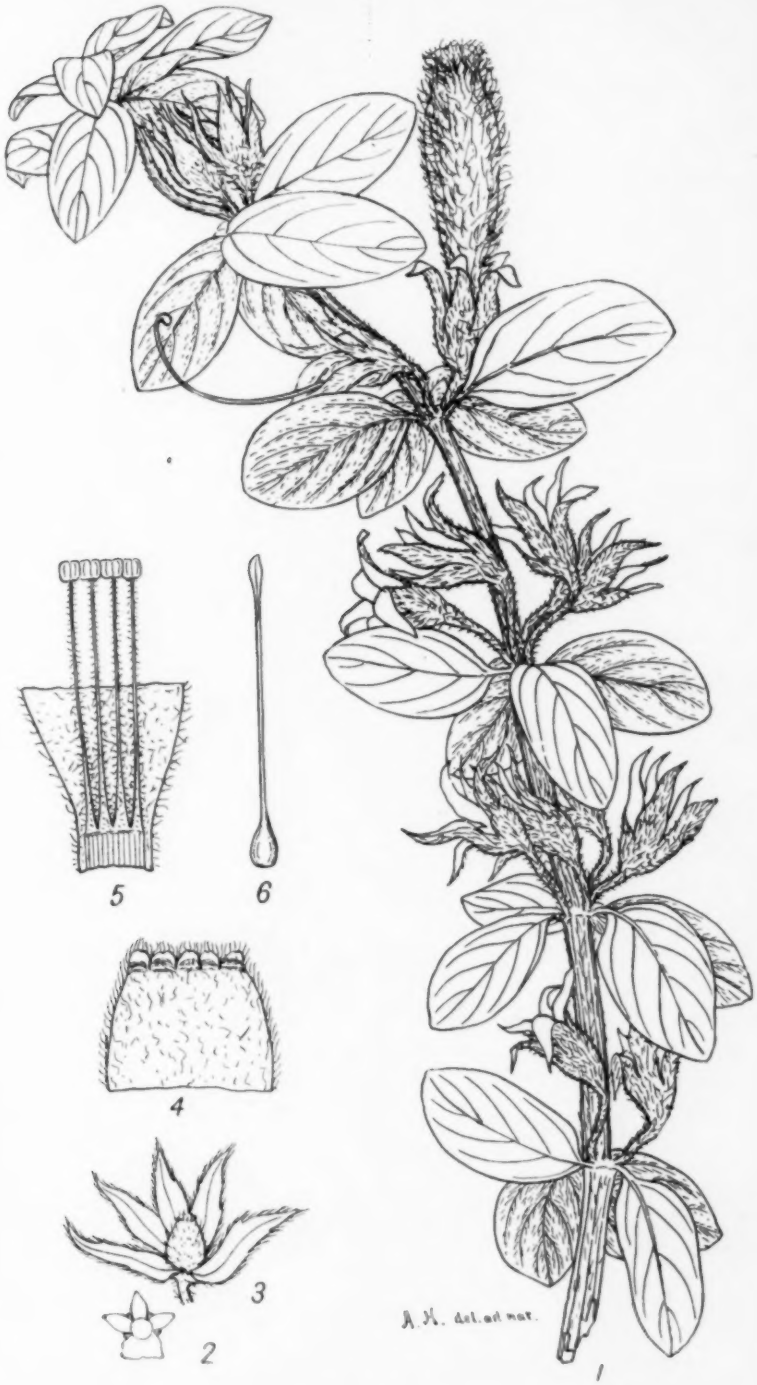
OXALIS GRANDIS SMALL.



POLYGONUM BOREALE (LANGE) SMALL.



LOPHOPAPPUS FOLIOSUS RUSBY.



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No. 6. An Enumeration of the Plants Collected by Dr. H. H. Rusby in South America, 1886–1887. By N. L. Britton. (Twenty-three parts published; not yet completed.)

No. 7. The Genus *Hicoria* of Rafinesque. By N. L. Britton (1888), . . 25 cents.

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